Methamphetamine: Physiological and Neuropsychological Effects

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Developed for the DOC Advisory Committee

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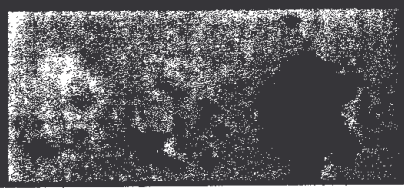
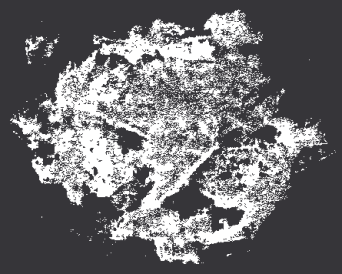
Speed: Street Methamphetamine

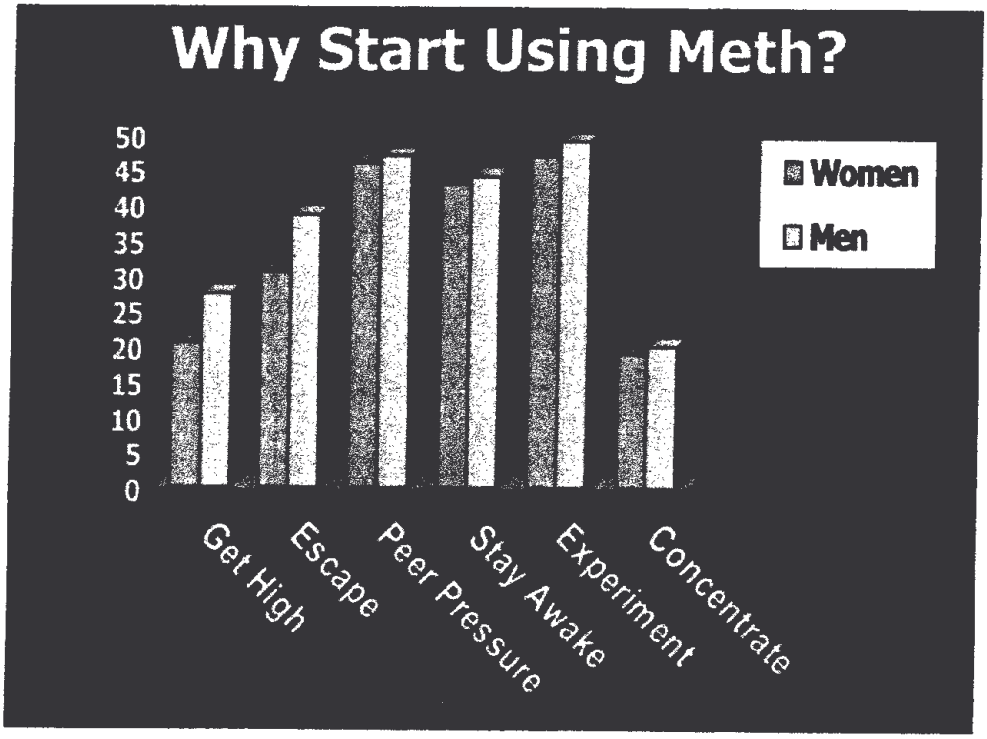
- White bitter, water-soluable powder ranging in color from white, yellow, orange, pink, or brown.
- It can be snorted, injected or eaten.
- Color variations are due to differences in chemicals used to produce it and the expertise of the cooker.
- Other names: speed, shabu, crystal, crystal meth, crank, tina, yaba, go-fast

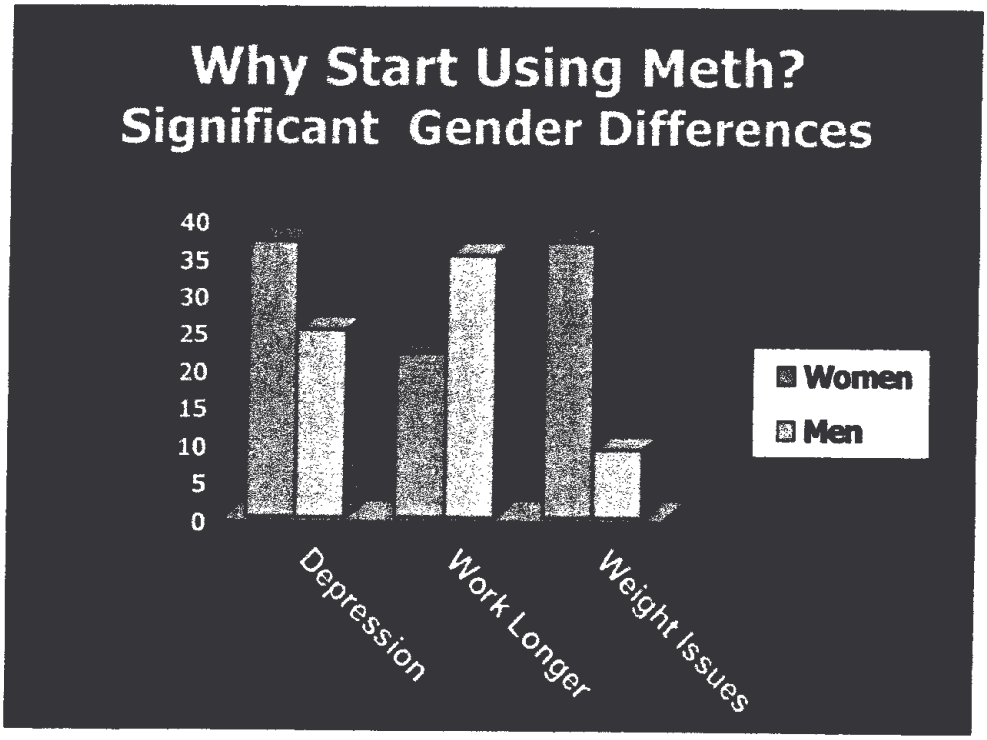


Ice: Methamphetamine Hydrochloride

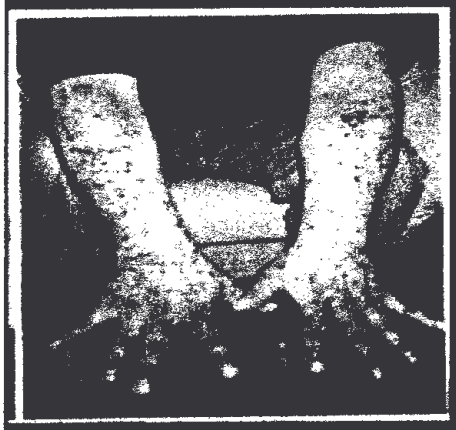
- Clear, chunky crystals or coarse powder, ranging from translucent to white, sometimes with a green, blue or pink tinge
- It disintegrates if burned at too high a heat so it is usually smoked in glass or foil
- It is known as crystal meth, glass or ice




Why Start Using Meth?
50
45
40
35
30
25
20
15
10
5
0
Women
Men
Get High
Escape
Peer Pressure
Stay Awake
Experiment
Concentrate


Why Start Using Meth?
Significant Gender Differences
40
35
30
25
20
15
10
5
0
Women
Men
Depression
Work Longer
Weight Issues

METHAMPHETAMINE EFFECTS



Acute Physical Effects

Increases	Decreases
Heart rate	Sleep
Blood pressure	Appetite
Pupil size	Reaction time
Respiration	
Sensory acuity	
Energy	

Toxicity

- **CNS:** Psychosis, Strokes, and Seizure
- **Cardiovascular:** Arrhythmic sudden death, Myocardial infarction and Cardiomyopathy
- **Pulmonary:** Acute pulmonary congestion and COPD
- **Renal:** Renal and Hepatic failure

Chronic Physical Effects

Tremor
Weakness
Headaches
Diarrhea
Cough
Sinus infection
Rash/skin sores

Acute Psychological Effects

Increases	Decreases
Confidence	Boredom
Alertness	Loneliness
Mood	Timidity
Sex drive	
Talkativeness	

Acute MA Psychosis

- Extreme Paranoid Ideation
- Well Formed Delusions
- Hypersensitivity to Environmental Stimuli
- Stereotyped Behavior "Tweaking"
- Panic, Extreme Fearfulness
- High Potential for Violence

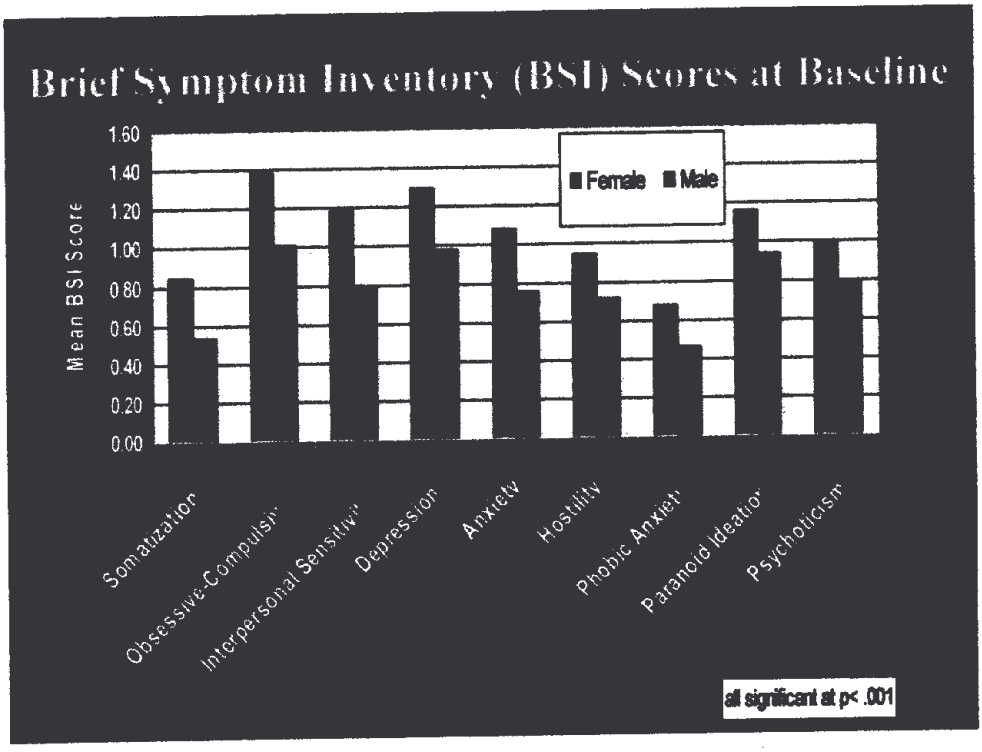
Chronic Psychological Effects

Confusion
Concentration
Hallucinations
Fatigue
Memory loss
Insomnia
Irritability
Paranoia
Panic reactions
Depression
Anger
Psychosis

Methamphetamine Withdrawal

- Depression
- Fatigue
- Anxiety
- Agitation
- Anergia
- Paranoia
- Cognitive Impairment
- Confusion

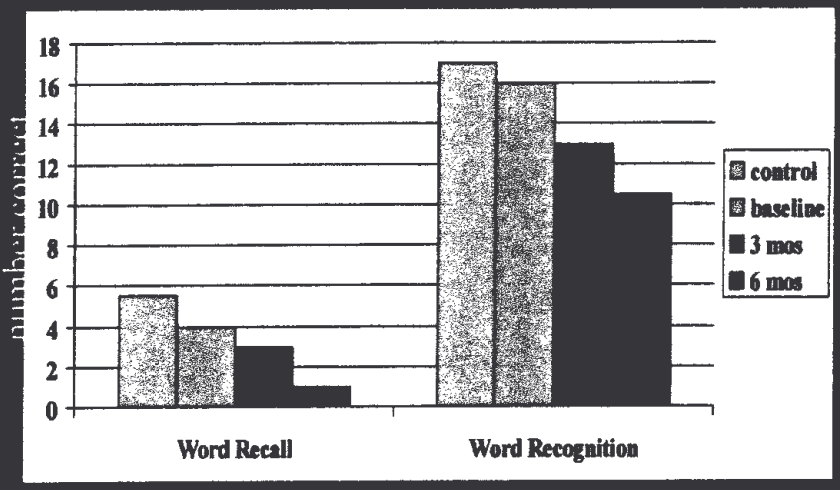
Duration: From 2 Days to 2 Weeks



Cognitive Effects

- **Actively using MA addicts show impairments in:**
  - **the ability to manipulate info**
  - **the ability to make inferences**
  - **the ability to ignore irrelevant information**
  - **the ability to learn**
  - **the ability to recall material**

Longitudinal Memory Performance



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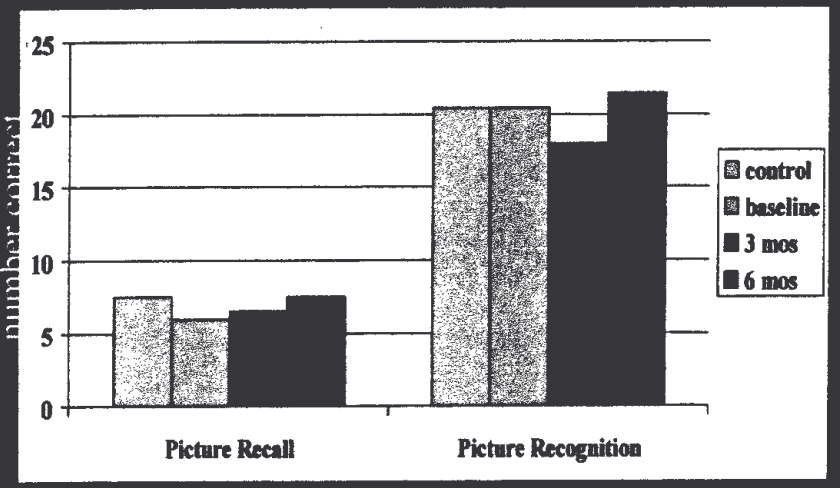
Longitudinal Memory Performance



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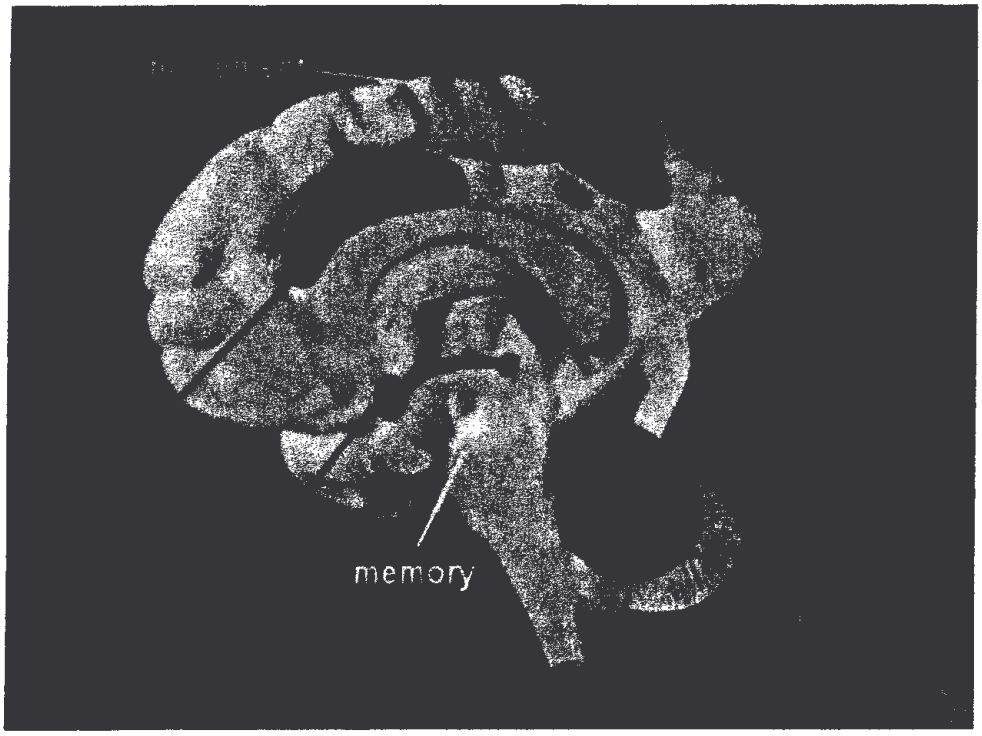
Initiating MA Abstinence

- **Key Clinical Issues**
  - Depression
  - Cognitive Impairment
  - Continuing Paranoia
  - Anhedonia
  - Behavioral/Functional Impairment
  - Hypersexuality
  - Conditioned Cues
  - Irritability/Violence

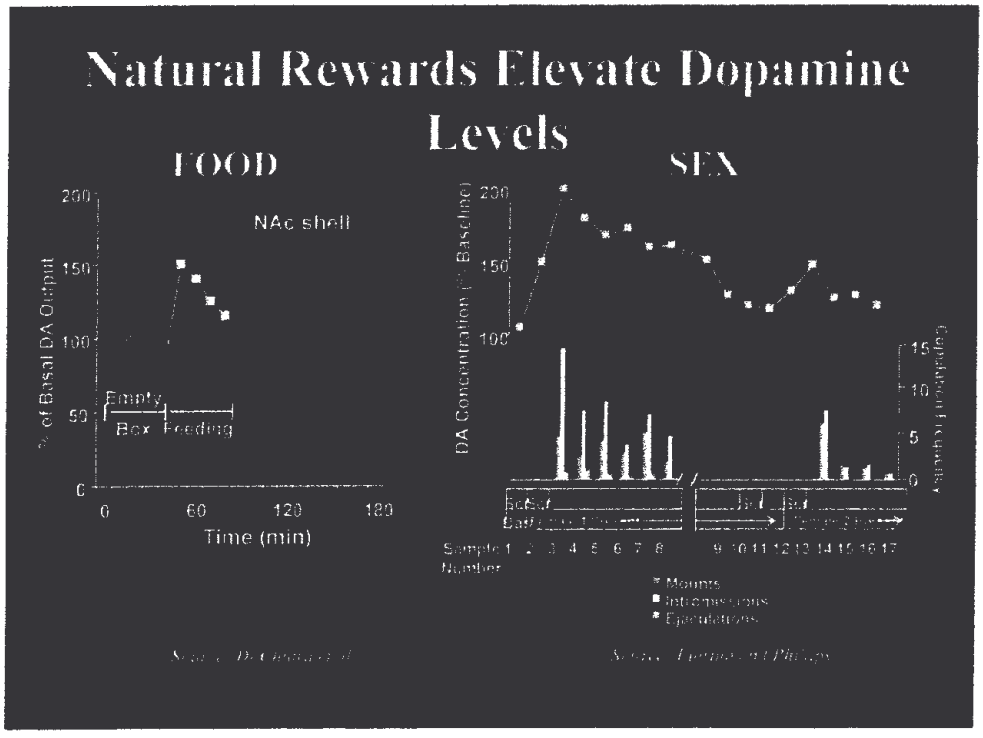
Amygdala Effects: The Memory of Drugs

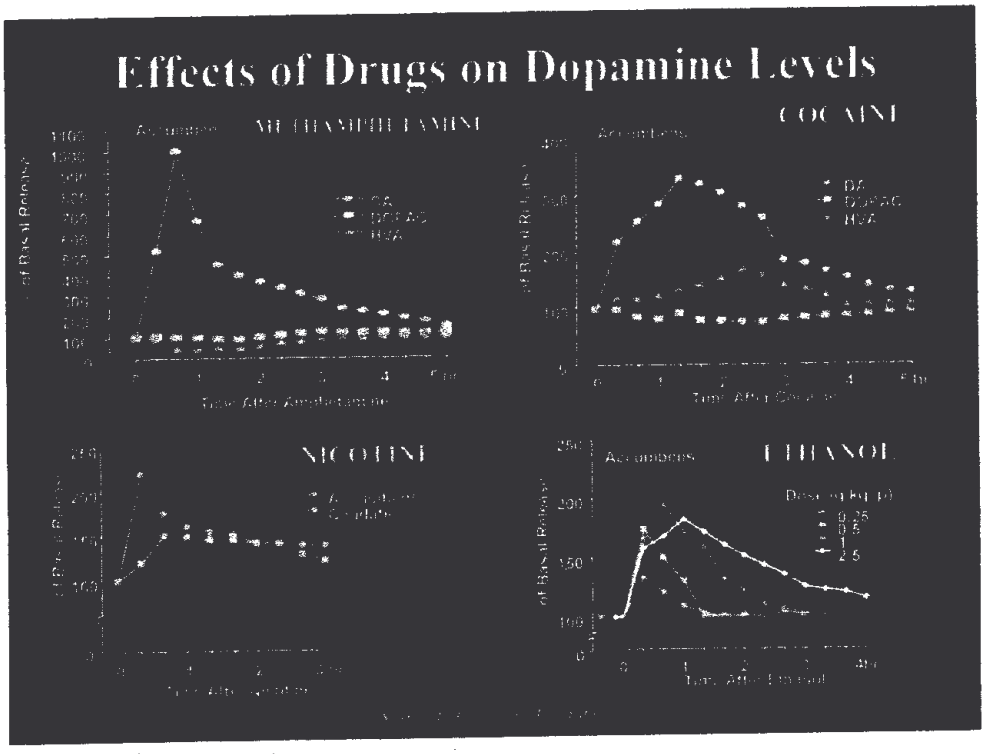
Nature Video

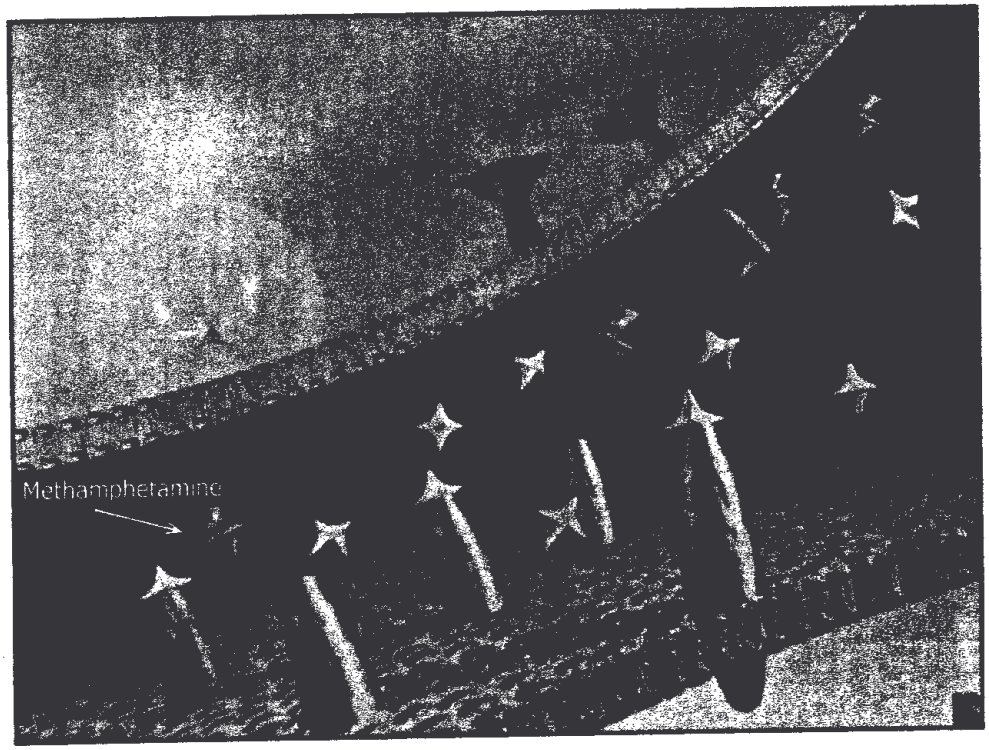
Cocaine Video



Natural Rewards Elevate Dopamine Levels



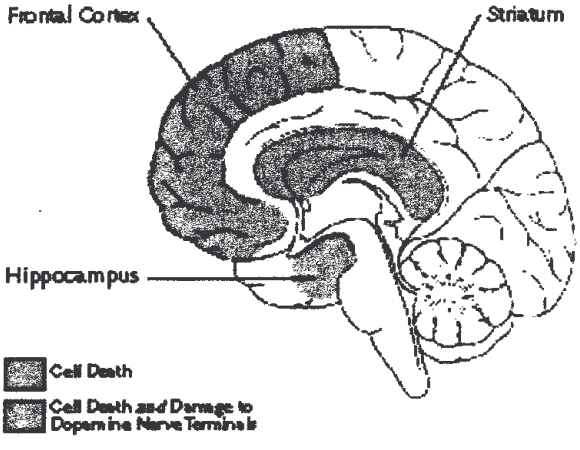

Effects of Drugs on Dopamine Levels
METHAMPHETAMINE
COCAINE
NICOTINE
ETHANOL


Methamphetamine

Decreased dopamine transporter binding in METH users resembles that in Parkinson's Disease patients

Control Meth PD

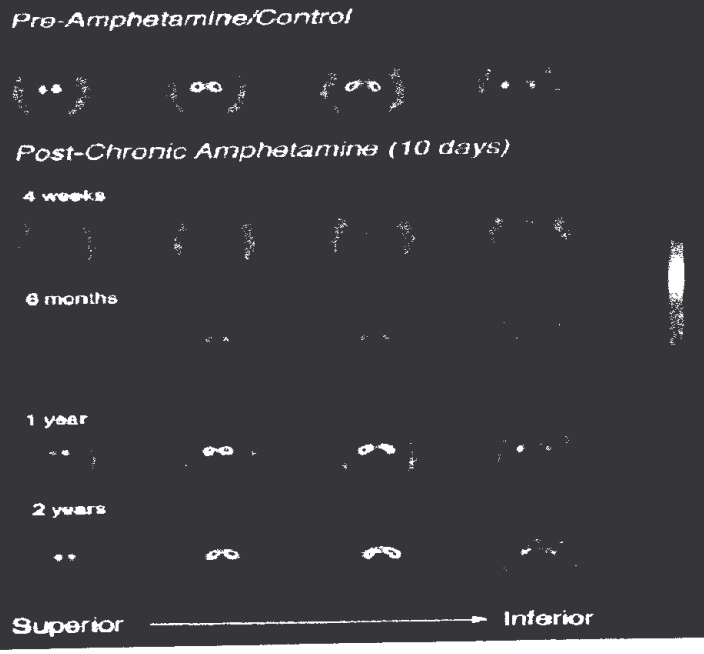
Cell Death and Dopamine Damage in Meth Users' Brains



Areas of Brain Damage

- Frontal Cortex (thought, perception, movement, problem solving, learning, recognizing future consequences, choosing between good and bad options, and overriding unacceptable social responses)
- Hippocampus (memory, information retrieval, and emotion regulation)
- Striatum (planning, executive functioning, response to reward and punishment)

PET Scan of Long-Term Meth Brain Damage



Partial Recovery of Brain Dopamine Transporters in Methamphetamine (METH) Abuser After Protracted Abstinence

STAGES OF RECOVERY - STIMULANTS

OVERVIEW